

Concrete Tolerance Coordination

ASCC Position Statement #18

As indicated in these ACI document excerpts, specifiers must coordinate tolerances in the project specifications:

- “The engineer/architect should be responsible for coordinating the tolerances for concrete work with the tolerance requirements of other trades whose work adjoins the concrete construction” (“Guide to Formwork for Concrete (ACI 347-01)”); and
- “Designers are cautioned to use finish and architectural details that are compatible with the type and anticipated method of construction. The finish and architectural details used should be compatible achievable concrete tolerances.” (“Commentary on Standard Specifications for Tolerances for Concrete Construction and Materials (ACI 117R-90).”)

Contractors coordinate their own work, but they aren’t responsible for adjusting tolerances or ensuring that tolerances for the work of other trades are compatible with their own work. Only the design professional can decide which tolerances are reasonable and compatible. Construction cost increases as tolerances become more stringent, so the owner’s cost is also a factor.

ASCC has identified some tolerance compatibility issues that should be addressed by the design professional:

- F-number versus straightedge flatness requirements for gym flooring, vinyl tile, seamless flooring, and similar applications-see ASCC Position Statement #6, “Division 3 versus Division 9 Floor Flatness Tolerances”;
- Floor flatness variations with time-also discussed in #6;
- Elevator manufacturers’ versus concrete contractors’ wall tolerances for vertical and lateral alignment-ASCC recommends adding at least 2 in. (50 mm) to the minimum elevator plan dimensions provided by the elevator manufacturer;
- Relative alignment for plaster and concrete walls-ASTM C 926-98a, “Standard Specification for Application of Portland Cement-Based Plaster,” allows 1/4 in. (6 mm) per 10 ft (3 mm) while ACI 117-90 allows 3/8 in. (10 mm) in 10 ft. ASCC believes the ACI 117-90 tolerance for concrete is appropriate when plaster will be applied in at least two coats. For a one-coat, thin proprietary plaster product, consult the product manufacturer for tolerances;

- Steel (AISC) versus concrete (ACI 117) anchor bolt positioning tolerances-see ASCC Position Statement #14, “Anchor Bolt Tolerances”;
- Fit for full-height curtain wall between concrete floors-ASCC recommends providing an architectural detail at the top of the wall that will accommodate a 1-1/2 in. (38 mm) movement, based on a $\pm 3/4$ in. (± 19 mm) elevation tolerance at both the soffit of the top slab and the surface of the slab; and
- Smooth form concrete wall finish when walls will be painted or coated-see ASCC Position Statement #8, “Bugholes in Formed Concrete.”

Preconstruction meeting topics should include the allowable concrete tolerances and tolerances for other trades, including how and when the tolerances will be measured, who will measure the tolerances (the test lab currently measures F-number tolerances and ASCC recommends that they measure for other tolerances), and the effect of deflections (shoring removal), shrinkage, post-tensioning, and temperature.

ASCC concrete contractors will work with architects and engineers in addressing these issues. If you have any questions, contact your ASCC concrete contractor or the ASCC Technical Hotline at (800) 331-0668.

Update: ACI 347-04 contains the same wording as that in ACI 347-01. The Commentary for the introduction to ACI 117-10 contains similar wording as follows:

Compatibility—Designers are cautioned to use finish and architectural details that are compatible with the type and anticipated method of construction. The finish and architectural details used should be compatible with achievable concrete tolerances.

ASTM C926-06 still requires that “Surfaces of solid bases to receive plaster...shall be straight and true within 1/4 in. in 10 ft...” Section 4.8.2 in ACI 117-10 allows a deviation from slope or plane for formed surfaces of 0.36 in. (0.3% x 120 in.) over 10 ft.

(08-11 update replaces 07-04 original)



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